[32/56] SEAT No._____

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SARDAR PATEL UNIVERSITY

M. Sc. (IV Semester) Examination

Saturday, 23rd March, 2019

10:00 a.m. to 01:00 p.m.

Microbiology/Biotechnology

PS04EMIC/BIT23 – Microbial Physiology

Total marks: 70

Q.1 Select the right/most appropriate answer for the following: (08 marks)

A. Penicillin interfere with bacterial cell-wall synthesis by inhibiting
   a. Alanine racemase
   b. DD-transpeptidase
   c. UMP kinase
   d. Pyrophosphatase

B. _____ is the unique component of the core region of lipopolysaccharide of most gram-negative organisms.
   a. D-glucosamine
   b. Teichoic acids
   c. 2-keto-3-deoxyoctulosonine acid
   d. β-hydroxy myristic acid

C. Which of the following flagellar protein is involved in conducting protons across the cytoplasmic membrane?
   a. Fli G
   b. Fli M
   c. Fli N
   d. Mot A/Mot B

D. Which of the following enzyme protect aerobic organisms from toxicity of ROS?
   a. Superoxide dismutase
   b. Catalase
   c. NADH oxidase
   d. Both a and b

E. Which of the following shows swarming motility?
   a. *Caulobacter*
   b. *Spirochetes*
   c. *E. coli*
   d. None of the above

F. Which of the following is true for Methylotrophs?
   a. Autotrophs
   b. Photoautotrophs
   c. Heterotrophs
   d. Lithotrophs

G. Enterobactin is which types of siderophores?
   a. Catecholate
   b. Hydroxamates
   c. Carboxylate
   d. None of the above

H. Which of the following quorum sensing circuit is found in *Staphylococcus aureus?*
   a. Com
   b. Agr
   c. CSF
   d. Cqs

(P.T.O.)

Q.2 Answer/attempt **any seven** from the following: (14 marks)

a) What is two-partner protein secretion system?
b) Write in brief on ABC transporter.
c) What is the function and composition of spore coat?
d) Write in brief about significance of siderophores production.
e) Define: Symbiosis and Commensalism.
f) Differentiate between Bacteriocin and Antibiotic.
g) What are the characteristics of microbial reserve compounds?
h) Enlist the microorganisms used in MFC.
i) Write a brief note on phosphate assimilation in *E. coli*.

Q.3 A. Explain the molecular mechanism of chemotaxis in detail. (06 marks)
B. Explain Peptidoglycan biosynthesis. (06 marks)

OR

B. Describe the general mechanism of insertion of integral membrane proteins and export of periplamic proteins. (06 marks)

Q.4 A. Describe the physiological events leading to *E. coli* cell division. (06 marks)
B. Discuss in detail on EnvZ/OmpR two-component system. (06 marks)

OR

B. Explain the yeast cell cycle regulation in detail. (06 marks)

Q.5 A. Discuss in detail on protein synthesis inhibiting antibiotics. (06 marks)
B. Discuss the steps of biofilm formation and its control strategy. (06 marks)

OR

B. Write a note on biochemistry of bioluminescence. (06 marks)

Q.6 A. Describe in detail on A-B toxin with suitable example. (06 marks)
B. Discuss quorum sensing mechanism in Gram-negative bacteria with one suitable example. (06 marks)

OR

B. Write a note on Microbial hydrogen production. (06 marks)